CLAIMS

1. A method comprising:

forming a material over a substrate;

oxidizing the material; and

separately from the oxidizing, converting at least a portion of the oxidized material to a perovskite-type crystalline structure.

2. The method of claim 1 wherein the substrate comprises a capacitor electrode and the converted, oxidized material comprises a capacitor dielectric layer.

3. The method of claim 1 wherein the substrate comprises a semiconductor wafer.

4. The method of claim 1 wherein the material comprises an alloy of at least two metals.

5. The method of claim 4 wherein at least two of the metals exhibit a substantial difference in chemical affinity for oxygen.

6. The method of claim 1 wherein the forming the material comprises depositing the material in a vacuum chamber at less than atmospheric pressure.

7. The method of claim 1 wherein the oxidizing and the converting occur in different process chambers.

8. The method of claim 1 wherein the forming the material occurs in a processing device comprising one or more chambers and the oxidizing comprises substantially complete oxidation of the material also in the processing device prior to removal from the processing device.

9. The method of claim 1 wherein the oxidizing comprises oxidizing at least an outer portion of the material and implanting oxygen ions into the outer portion, the oxidizing the outer portion and implanting occurring *in situ* with the forming the material.

10. The method of claim 9 wherein the oxidizing the outer portion comprises exposure to an oxygen plasma.

11. The method of claim 1 wherein the oxidizing the material comprises oxidizing only a first portion of the material and the method further comprises, separately from the converting, oxidizing a second portion of the material beneath the first portion.

12. The method of claim 11 wherein the oxidizing only the first portion occurs *in situ* with the forming the material.

13. The method of claim 1 further comprising forming a passivation layer to carbon and nitrogen over the material.

14. The method of claim 13 wherein the oxidizing the material comprises oxidizing only a first portion of the material, the forming the passivation layer occurs *in situ* with the forming the material, and the method further comprises oxidizing the passivation layer and thereafter oxidizing a second portion of the material *in situ* with the oxidizing the passivation layer.

15. The method of claim 1 wherein the converting comprises heating the oxidized material and reaching a maximum temperature no more than about one-half of a melting point temperature of the perovskite-type material.

16. The method of claim 1 further comprising converting an additional oxidized material to a perovskite-type crystalline structure.

17. A method comprising:

forming an alloy material comprising at least two metals over a substrate;

retarding interdiffusion of the at least two metals;

oxidizing the alloy material after the retarding interdiffusion; and

converting at least a portion of the oxidized alloy material to a perovskite-type crystalline structure.

18. The method of claim 17 wherein the substrate comprises a capacitor electrode and the converted, oxidized alloy material comprises a capacitor dielectric layer.

19. The method of claim 17 wherein the oxidizing and the converting occur in different process chambers.

20. The method of claim 17 wherein the forming the alloy material occurs in a processing device comprising one or more chambers and the retarding interdiffusion and the oxidizing together comprise substantially complete oxidation of the material also in the processing device prior to removal from the processing device.

21. The method of claim 17 wherein the retarding interdiffusion comprises oxidizing at least an outer portion of the alloy material and implanting oxygen ions into the outer portion, the oxidizing the outer portion and implanting occurring *in situ* with the forming an alloy material.

22. The method of claim 21 wherein the oxidizing the alloy material after the retarding interdiffusion comprises oxidizing an inner portion of the alloy material and such oxidizing occurs separately from the converting.

23. The method of claim 17 wherein the retarding interdiffusion occurs *in situ* with the forming the alloy material.

24. The method of claim 17 further comprising forming a passivation layer to carbon and nitrogen reaction over the alloy material, the oxidizing occurring after the forming the passivation layer.

25. The method of claim 24 wherein the forming the passivation layer occurs *in situ* with the forming the alloy material and the method further comprises oxidizing the passivation layer, the oxidizing the alloy material occurring *in situ* with the oxidizing the passivation layer.

26. The method of claim 17 wherein the converting comprises heating the oxidized alloy material and reaching a maximum temperature no more than about one-half of a melting point temperature of the perovskite-type material.

27. The method of claim 17 further comprising converting an additional oxidized alloy material to a perovskite-type crystalline structure.

28. A capacitor dielectric forming method comprising:

forming an alloy layer comprising at least two metals over a capacitor electrode;

oxidizing the alloy layer; and

converting the alloy layer to form a capacitor dielectric layer comprising a perovskite-type crystalline structure.

29. The method of claim 28 wherein at least two of the metals exhibit a substantial difference in chemical affinity for oxygen.

30. The method of claim 28 wherein the oxidizing and the converting occur in different process chambers.

31. The method of claim 28 wherein the forming the alloy layer occurs in a processing device comprising one or more chambers and the oxidizing comprises substantially complete oxidation of the alloy layer also in the processing device prior to removal from the processing device.

32. The method of claim 28 wherein the oxidizing comprises oxidizing at least an outer portion of the alloy layer and implanting oxygen ions into the outer portion, the oxidizing the outer portion and the implanting retarding interdiffusion of the metals.

33. The method of claim 28 wherein the oxidizing comprises oxidizing only a first portion of the alloy layer and the method further comprises, separately from the converting, oxidizing a second portion of the alloy layer beneath the first portion.

34. The method of claim 28 further comprising forming a passivation layer to carbon and nitrogen over the alloy layer.

35. The method of claim 28 wherein the converting comprises heating the oxidized alloy layer and reaching a maximum temperature no more than about one-half of a melting point temperature of the perovskite-type alloy layer.

36. The method of claim 28 further comprising converting an additional alloy layer to form an additional capacitor dielectric layer comprising a perovskite-type crystalline structure.

37. A capacitor dielectric forming method comprising:

vacuum depositing an alloy layer comprising at least two metals exhibiting a substantial difference in chemical affinity for oxygen, the vacuum depositing occurring over a capacitor electrode in a processing device comprising one or more chambers;

oxidizing a first portion of the deposited alloy layer with an oxygen plasma and implanting oxygen ions into the deposited alloy layer, the oxidizing and the implanting occurring at a first temperature in the processing device after the vacuum depositing but before removal from the processing device;

oxidizing a second portion of the deposited alloy layer; and

separately from the oxidizing the first and second portions, heating the oxidized alloy layer, converting at least a portion of the oxidized alloy layer to a perovskite-type crystalline structure to form a capacitor dielectric layer, and reaching a second temperature greater than the first temperature but no more than about one-half of a melting point temperature of the layer portion having the perovskite-type structure.

38. The method of claim 37 wherein the oxidizing the first portion occurs *in situ* with the depositing.

39. The method of claim 37 wherein the oxidizing the first and second portions occurs together.

40. The method of claim 37 further comprising vacuum depositing a passivation layer to carbon and nitrogen reaction over the alloy layer and oxidizing the passivation layer to an additional dielectric layer before the oxidizing the second portion of the deposited alloy layer.

41. The method of claim 40 wherein the depositing the passivation layer occurs in the processing device after the oxidizing the first portion but before removal from the processing device.

42. The method of claim 40 wherein the oxidizing the second portion occurs *in situ* with the oxidizing the passivation layer.

43. The method of claim 37 wherein the second portion is oxidized at a third temperature between the first temperature and the second temperature.

44. The method of claim 37 further comprising converting at least a portion of an additional oxidized alloy layer to a perovskite-type crystalline structure to form an additional capacitor dielectric layer.

45. A capacitor dielectric produced by the method of claim 37.

46. A capacitor dielectric forming method comprising:

forming a first alloy layer comprising at least two metals over a capacitor electrode;

forming a second alloy layer comprising at least two metals over the first alloy layer;

oxidizing the first alloy layer;

oxidizing the second alloy layer;

processing the first alloy layer to form a first capacitor dielectric layer comprising a perovskite-type crystalline structure; and

processing the second alloy layer to form a second capacitor dielectric layer comprising a perovskite-type crystalline structure.

47. The method of claim 46 comprising completing the processing the first alloy layer before the forming second alloy layer.

48. The method of claim 46 comprising oxidizing the first and second alloy layers together.

49. The method of claim 46 comprising processing the first and second alloy layers together.

50. A capacitor dielectric forming method comprising:

vacuum depositing an alloy layer comprising at least two metals exhibiting a substantial difference in chemical affinity for oxygen, the vacuum depositing occurring over a capacitor electrode;

oxidizing substantially all of the deposited alloy layer using at least an oxygen plasma and implantation of oxygen ions into the deposited alloy layer, the oxidizing and the implanting occurring at a first temperature *in situ* with the depositing; and

separately from the oxidizing, heating the oxidized alloy layer, converting substantially all of the oxidized alloy layer to a crystalline structure to form a capacitor dielectric layer, and reaching a second temperature greater than the first temperature and about one-third of a melting point temperature of the layer having the crystalline structure.

51. A capacitor dielectric forming method comprising:

vacuum depositing an alloy layer comprising at least two metals exhibiting a substantial difference in chemical affinity for oxygen, the vacuum depositing occurring over a capacitor electrode;

oxidizing a first portion of the deposited alloy layer with an oxygen plasma and implanting oxygen ions into the deposited alloy layer, the oxidizing and the implanting occurring at a first temperature and *in situ* with the depositing the alloy layer;

vacuum depositing a passivation layer to carbon and nitrogen reaction over the oxidized alloy layer *in situ* with the oxidizing the first portion;

oxidizing the passivation layer to form an outer capacitor dielectric layer;

oxidizing a second portion of the deposited alloy layer *in situ* with the oxidizing the passivation layer;

separately from the oxidizing the first and second portions, heating the oxidized alloy layer, converting at least a portion of the oxidized alloy layer to a crystalline structure to form an inner capacitor dielectric layer, and reaching a second temperature greater than the first temperature and about one-third of a melting point temperature of the layer having the crystalline structure.

52. A capacitor construction comprising:

an inner electrode;

an inner dielectric layer over the inner electrode, the inner dielectric layer comprising an oxidized alloy of at least two metals in a perovskite-type crystalline structure;

an outer dielectric layer over the inner dielectric layer, the outer dielectric layer comprising an oxide of a material and the material exhibiting passivation against carbon and nitrogen reaction; and

an outer electrode over the outer dielectric layer.

53. The capacitor construction of claim 52 wherein the outer dielectric layer is on the inner dielectric layer.

54. The capacitor construction of claim 52 further comprising a middle dielectric layer between the inner and outer dielectric layers, the middle dielectric layer comprising an oxidized alloy of at least two metals in a perovskite-type crystalline structure.

55. The capacitor construction of claim 52 produced by a process comprising:

vacuum depositing an inner layer comprising the alloy of at least two metals, the vacuum depositing occurring over the inner electrode in a processing device comprising one or more chambers;

oxidizing a first portion of the deposited inner alloy layer with an oxygen plasma and implanting oxygen ions into the deposited inner alloy layer, the oxidizing and the implanting occurring at a first temperature in the processing device after the vacuum depositing but before removal from the processing device;

vacuum depositing a passivation layer to carbon and nitrogen reaction over the inner alloy layer;

oxidizing the passivation layer to form the outer dielectric layer;

oxidizing a second portion of the deposited inner alloy layer; and

separately from the oxidizing the first and second portions, heating the oxidized inner alloy layer, converting at least a portion of the oxidized inner alloy layer to a perovskite-type crystalline structure to form the inner dielectric layer, and reaching a second temperature greater than the first temperature but no more than about one-half of a melting point temperature of the layer portion having the perovskite-type structure.